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ABSTRACT

The purpose of this study was to investigate the construct validity of the Career Maturity Inventory with ninth grade pupils. To demonstrate the construct validity it must be shown that the Career Maturity Inventory correlates highly with other variables with which it should theoretically correlate, and that it does not correlate with variables from which it should differ. The model of career maturity is hierarchical and is organized according to four dimensions: Consistency of Career Choice, Realism of Career Choices, Career Choice Competencies, and Career Choice Attitudes. Since the Career Maturity Inventory was designed to measure the Career Choice Attitudes and the Career Choice Competencies dimensions in the model of career maturity, the expected relationships among career maturity, intelligence, and student achievement can be stated in hypothesis form and tested empirically. The sample consisted of all 312 ninth grade pupils enrolled in a rural public school in central North Carolina: 64 white males, 56 white females, 112 black males, and 80 black females. The tests used were the Career Maturity Inventory Attitude Scale and Competence Test, the Otis-Lennon Mental Ability Test, and the Reading and Language subtests of the 1970 Metropolitan Achievement Test. (Author/JEL)

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Career Maturity of Ninth Grade Pupils: Real or Imaginary?

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Career Maturity of Ninth Grade Pupils: Real or Imaginary?

The purpose of this study was to investigate the construct validity of the Career Maturity Inventory with ninth grade pupils. There are at least four good reasons for carrying out such a study. First, the Career Maturity Inventory is probably the most widely used instrument to provide a criterion measure of career maturity. In her review of selected literature published in 1976 on vocational behavior and career development, Betz (1977) devoted considerable discussion to career maturity research, most of which was based on the Career Maturity Inventory.

Second, the Career Maturity Inventory provides measures of variables which enter into theoretical schemes such as the model of career maturity and other constructs (Crites, 1965, 1973a, 1974b).

Third, studies of the construct validity of the Career Maturity Inventory are rare. A review of the literature revealed no reported studies that investigated the relationship between the Career Maturity Inventory and standardized measures of intelligence and educational achievement with a common sample of pupils. What psychological or other property or properties can explain the variance of the Career Maturity Inventory? What factors lie behind test performance on the Career Maturity Inventory? What constructs account for variance in performance on the Career Maturity Inventory? Does the Career Maturity Inventory measure verbal ability and abstract reasoning ability? Does it also measure school achievement?

Fourth, many of the claims and criticisms of the Career Maturity Inventory have not been supported with empirical data. For example, data should be collected to investigate the criticism that the Career Maturity Inventory Competence Test "may measure reading comprehension and general information,

but hardly seems specifically relevant for career decision making" (Katz, Norris, and Pears, 1978, p. 223). What is the evidence that the Career Maturity Inventory provides valid measures of the model of career maturity? Research is needed to determine whether the Career Maturity Profile can be used in profile analysis, for example, to identify a person with "relatively high scores on the Self-Appraisal and Occupational Information subtest but a low score on Goal Selection " (Crites, 1973a, p. 37). Where is the evidence that the Career Maturity Inventory "yields scores for six major aspects of vocational maturity..." (Super, 1974a, p. 164). Answers to these questions could provide support for the construct validity of the Career Maturity Inventory.

How can we demonstrate the construct validity of the Career Maturity Inventory? We must show not only that the Career Maturity Inventory correlates highly with other variables with which it should theoretically correlate, but also that it does not correlate with variables from which it should differ (Campbell & Fiske, 1959). The former process is referred to as convergent validation and the latter as discriminant validation. Correlation of a career maturity measure with a different career maturity measure would be an example of convergent validation. For the Career Maturity Inventory, discriminant validity would be illustrated by a low and insignificant correlation with scores on a reading comprehension test, since reading ability is an irrelevant variable in a test designed to measure career maturity. For satisfactory construct validity, the correlation between two different career maturity measures should be higher than the correlation between career maturity scores and mental ability scores. If the latter correlation were high, it might indicate, for example, that a person's scores on the career maturity

measures are unduly affected by some irrelevant common factor such as the ability to understand the questions.

The model of career maturity (Crites, 1965, 1973a, 1974b) provides the basis for deriving hypotheses from the theory involving the construct. The model is hierarchical and is organized according to four dimensions: Consistency of Career Choices, Realism of Career Choices, Career Choice Competencies, and Career Choice Attitudes. Each dimension is divided into variables. Consistency of Career Choices is subdivided into Time, Field, and Level. Realism of Career Choices is subdivided into Abilities, Interests, Personality, and Social Class. Career Choice Competencies include Self-Appraisal, Occupational Information, Goal Selection, Planning, and Problem Solving. Career Choice Attitudes consist of five variables: Involvement, Orientation, Independence, Preference, and Conception.

Since the Career Maturity Inventory was designed to measure the Career Choice Attitudes and the Career Choice Competencies dimensions in the model of career maturity, the expected relationships among career maturity, intelligence, and student achievement can be stated in hypothesis form and tested empirically.

First, the correlation between the Attitude Scale and the Competence Test total score should be positive and significant; it should be in .50s or .60s. Although theoretically the Career Choice Attitudes and Career Choice Competencies dimensions are "correlated in the .30s or .40s" (Crites, 1974b, p. 301) with each other, research studies with ninth graders have reported correlations of .56 (Westbrook, 1976c) and .64 (Westbrook, 1976d) between the Attitude Scale and the Competence Test total score.

Second, the correlation between the Attitude Scale and the Competence Test

part scores should be in the .40s and .50s. This prediction is based upon the results of previous investigations (Westbrook, 1976c, 1976d; Gasper and Omvig, 1976).

Third, the intercorrelations of the Competence Test part scores should range "between the .40s and .60s" (Crites, 1973a, p. 36). This prediction has been confirmed in studies of ninth graders (Westbrook, 1976c, 1976d; Crites, 1973a) as well as eleventh graders (Gasper & Omvig, 1976).

Fourth, the intercorrelations of the Competence Test part scores should be higher than the correlations between the Attitude Scale and the Competence Test part scores. The essence of this relationship can be demonstrated as follows: if the parts of the Competence Test are regarded as measures of a common process accounted for by the Career Choice Competencies dimension, and if the Attitude Scale is regarded as a measure of a different process accounted for by the Career Choice Attitudes dimension, then it is apparent that variables classified under the same dimension will have a greater proportion of shared elements, and, by virtue of that, higher intercorrelations (Westbrook, Note 6). This theoretical prediction was confirmed in a study of ninth graders which reported a median correlation of .62 among the Competence Test part scores and a median correlation of .47 between the Attitude Scale and the Competence Test part scores (Westbrook, 1976c). This trend was replicated in a second study (Westbrook, 1976d) using a different sample of ninth graders. Similar results have been reported for eleventh graders (Gasper & Omvig, 1976).

Fifth, the Attitude Scale should correlate more highly with the Competence Test total score than it does with measures of intelligence and school achievement.

Sixth, the Attitude Scale should correlate more highly with the Competence Test part scores than it does with measures of intelligence and school achievement.

The theory behind these predictions is as follows: The model of career maturity specifies the existence of a general career maturity factor which is defined by the common variance among the group factors (Crites, 1973a, 1974b). Since the Attitude Scale and the Competence Test are regarded as measures of a common process accounted for by the construct of career maturity, and since intelligence and educational achievement tests are regarded as measures of a different process accounted for by general intellectual ability, then it is apparent that variables subsumed under the model of career maturity should have more in common with each other than they do with measures of other traits such as intelligence and educational achievement.

Seventh, the Competence Test total score should be more highly correlated with the Attitude Scale than with measures of intelligence and school achievement.

Eighth, the Competence Test part scores should correlate more highly with the Attitude Scale than with measures of intelligence and school achievement. The rationale for these predictions are the same as the previous hypothesis: career maturity measures should have more in common with each other than they do with cognitive measures of intelligence and educational achievement. A review of the literature revealed no reported studies that investigated hypotheses 5, 6, 7, and 8.

Ninth, a factor analysis of the Career Maturity Inventory should yield more than one factor if it is measuring more than one dimension of career maturity. A review of the literature revealed no factor analytic studies of the Career Maturity Inventory.

Tenth, how satisfactory is the reliability of the Career Maturity Inventory? Previous studies of the reliability of the Career Maturity Inventory are

summarized in Table 1.

Insert Table 1 about here

Kuder-Richardson coefficients for the Attitude Scale range from .58 for a sample of 263 college sophomores and juniors (Moore & McClean, 1977) to .81 for a sample of 160 eighth graders (Mowsesian & Holley, Note 1) but the median is .65 (Crites, 1973a) which suggests that the Attitude Scale is not a highly homogeneous measure. Inasmuch as the Attitude Scale "was designed to measure related but not identical clusters of vocational attitudes" (Crites, 1973a, p. 14), the Kuder-Richardson technique may not be the most appropriate procedure for estimating reliability.

Measures of stability (retest) of the Attitude Scale range from .60 over a 4-month duration for college sophomores and juniors (Moore & McLean, 1977) to .78 over a 3-month interval for eighth grade pupils. Crites (1973a) reported a 12-month test - retest coefficient of stability of .71 but it should probably be discounted because it is based upon several grades combined.

In studies of the internal consistency of parts of the Competence Test, Crites (1973a) reported KR 20sin the .70s and .80s for ninth grade samples. Mowsesian and Holley (Note 1) reported that, with only one exception (r = .37), the coefficients range from .68 to .75 in the eighth grade. Why the KR 20s in grade eight are lower than those reported by Crites (1973a) for grade nine is not apparent from the data. There is a possibility that a zero point on some of the variables measured by the Competence Test are being approached in the upper elementary school years (Crites, 1973a). It follows, therefore, that the KR 20s might be expected to be higher among high school and college samples.

In the only reported study of the test-retest reliability of parts of the Competence Test since its publication in 1973, Mowsesian and Holley (Note 1)

found low four-month stability coefficients ranging from .58 to .66.

Method

Subjects

The sample was comprised of all 312 ninth grade pupils enrolled in a rural public school in central North Carolina: 64 white males, 56 white females, 112 black males, and 80 black females. The mean IQ level is 89.59, with a standard deviation of 13.01. The mean grade equivalent on reading is 6.63 with a standard deviation of 2.30. The mean language grade equivalent is 7.19 with a standard deviation of 2.33.

Instruments

The Career Maturity Inventory Attitude Scale (Crites, 1973c) consists of fifty items stated in both the first and third person and administered with a True-False format. The Attitude Scale raw score can be used "as an operational definition of the Career Choice Attitudes dimension in the model of career maturity" (Crites, 1973b, p. 31).

The Career Maturity Inventory Competence Test (Crites, 1973d) consists of five 20-item parts that were designed to measure the five variables which comprise the Career Choice Competencies dimension in the model of career maturity (Crites, 1973a): Self-Appraisal, Occupational Information, Goal Selection, Planning, and Problem Solving. On the Self-Appraisal subtest, the learner is given a description of the characteristics of an individual and a list of conclusions; the learner is required to identify the conclusion which represents the most accurate appraisal of the individual. The Occupational Information subtest items present the learner with a brief description of a job performed by an individual and a list of occupational titles; the learner is asked to identify the correct occupational title for the given job description. On the Goal Selection subtest, the learner is presented with a description of the characteristics and background of an individual; the learner

is required to identify, from a list of jobs, the job which would be most appropriate for the individual. The Problem Solving subtest items require the learner to identify, from a list of solutions, the best solution to a problem (for which a description is given) that a person is having in school or in choosing an occupation. The Planning subtest items require the learner to identify the correct sequence of steps required to enter a given occupation; the learner is given an occupational title and a list of steps that a person could complete in order to prepare for and enter the given occupation.

The Administration and Use Manual for the Career Maturity Inventory (Crites, 1973b) provides a brief, non-technical summary of the Career Maturity Inventory's construction and development as they pertain to its administration and use. The Theory and Research Handbook for the Career Maturity Inventory (Crites, 1973a) presents the theoretical background and summarizes the accumulated research on the Career Maturity Inventory Inventory's psychometric characteristics. Reviews of the Career Maturity Inventory have been written by Hansen (1974) and by Sorenson (1974).

The Otis-Lennon Mental Ability Test (Otis and Lennon, 1969a, 1969b) was designed to provide a measure of general mental ability. The authors describe it as a measure of "facility in dealing with abstract concepts presented in verbal, figural, or symbolic form" (Otis and Lennon, 1969a, p. 27) and it has been termed a measure of "general abstract reasoning ability" (Otis and Lennon, 1969a, p. 27). The Otis-Lennon yields a single deviation IQ score which may be considered an index of verbal-educational "g" (Otis and Lennon, 1969a). The one-year stability coefficient for one form of the Otis-Lennon was found to be .83 for 129 ninth grade pupils. The KR 20 estimate of internal consistency reliability in grade nine (N = 14, 746) is .95. The extensive validity data compare favorably with those reported

for other standardized group tests of mental ability.

The Reading and Language subtests of the 1970 Metropolitan Achievement Tests, Advanced (Harcourt Brace Jovanovich, 1970) provided measures of school achievement in reading and language. The reliability and validity data for the Metropolitan Achievement Tests compare favorably with those reported for other standardized achievement tests.

Data Collection

The Career Maturity Inventory Attitude Scale and Competence Test were administered in October, 1975, and agian in May, 1976, in regular class size units to ninth graders in the selected school. The instruments were administered and scored by graduate students under the general supervision of their tests and measurements instructor, the senior author. The junior author supervised the actual administration by monitoring all testing sessions. All test administrators and monitors were given training in the administration of the Career Maturity Inventory. Each answer sheet was hand scored twice by two different persons for verification purposes. Raw scores were recorded on computer data sheets.

In March, 1976, the Otis-Lennon Mental Ability Test was administered and scored by the teachers and counselor in the selected school under the supervision of the counselor. Each answer sheet was hand scored twice by two different persons for verification purposes and the Deviation IQ scores were recorded on each student's cumulative folder and on computer data sheets.

The 1970 Metropolitan Achievement Test had already been administered to the sample pupils in May, 1975, when they were in the eighth grade, and recorded on each pupil's cumulative folder. In May and June, 1976, the junior author recorded the pupils' Reading and Language grade equivalent scores on the computer data sheets.

Data Analysis

The data collection procedures provided the following ten scores:

1. Career Maturity Inventory Attitude Scale raw score (AS).
2. Career Maturity Inventory Competence Test, Self-Appraisal raw score (SA).
3. Career Maturity Inventory Competence Test, Occupational Information raw score (OI).
4. Career Maturity Inventory Competence Test, Goal Selection raw score (GS).
5. Career Maturity Inventory Competence Test, Planning raw score (PL).
6. Career Maturity Inventory Competence Test, Problem Solving raw score (PS).
7. Career Maturity Inventory Competence Test, total raw score (CTT). This score was obtained by adding up the five Competence Test part scores to provide a measure of the Career Choice Competencies dimension in the model of career maturity.
8. Otis-Lennon Mental Ability Test, Deviation IQ.
9. Metropolitan Achievement Test, Reading grade equivalent.
10. Metropolitan Achievement Test, Language grade equivalent.

To answer the questions posed by this study, the product-moment correlations among the ten scores were obtained and factor analyzed for both the first and second administrations of the Career Maturity Inventory.

The appropriate methodology for testing the hierarchical structure of the model of career maturity includes the "computation of factors for the various grade levels, applying the complete centroid method" (Crites, 1974b, p. 310). The principal-axes method, however, was used in this study because it gives a mathematically unique, least-squares solution, and the results are equivalent to the centroid method (Fruchter, 1954).

Results

The first hypothesis predicted that the Attitude Scale raw score and the Competence Test total raw score would be correlated in the .50s or .60s. Table 2 shows that the correlation obtained from the first administration of

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Insert Table 2 about here

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the Career Maturity Inventory was .59, which is within the predicted range. Table 3 shows that the correlation obtained from the second administration

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Insert Table 3 about here

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of the Career Maturity Inventory was .67, which is also within the predicted range. When the correlations were corrected for attenuation, the values were .70 and .80, respectively.

The second hypothesis stated that the correlations between the Attitude Scale raw score and the Competence Test subtest raw scores would be in the .40s and .50s. Table 2 shows that the correlations obtained from the first administration of the Career Maturity Inventory range from .47 to .51 and are within the predicted range. Table 3 shows that the correlations obtained from the second administration of the Career Maturity Inventory range from .53 to .59 and are also within the predicted range. When the correlations were corrected for attenuation, the values were higher, ranging from .60 to .68 for the first administration and from .70 to .79 for the second administration of the Career Maturity Inventory.

The third hypothesis predicted that the intercorrelations of the Competence Test subtest raw scores would range between the .40s and .60s. Table 2 shows that the r's for the first administration of the Competence Test range from .54 to .65 and are within the predicted range. Table 3 shows that

the correlations obtained from the second administration of the Competence Test range, with only one exception, from .51 to .63 which are also in the predicted range. When the intercorrelations were corrected for attenuation, the values were higher, ranging from .72 to .87 for the first administration and .74 to .97 for the second administration of the Competence Test.

The fourth hypothesis predicted that the intercorrelations of the Competence Test subtest raw scores should be higher than the correlations between the Attitude Scale and the Competence Test subtest raw scores. Table 2 shows that the results are consistent with the hypothesized relationship. The median intercorrelation of the Competence Test subtest raw scores ($r = .56$) is higher than the median correlation between the Attitude Scale raw score and the Competence Test subtest raw scores ($r = .48$). Table 3 shows a similar pattern for the second administration of the Career Maturity Inventory, the corresponding values being .58 and .55, respectively. When the correlations were corrected for attenuation, the same pattern of correlations was found. For the first administration of the Career Maturity Inventory, the median intercorrelation of the Competence Test subtest raw scores ($r = .79$) is higher than the median correlation between the Attitude Scale raw score and the Competence Test subtest raw scores ($r = .64$). The same pattern was found for the second administration, the corresponding r's being .78 and .71.

The fifth hypothesis stated that the Attitude Scale raw score should correlate more highly with the Competence Test Total raw score than it does with measures of intelligence and school achievement. Table 2 shows that, as predicted, the Attitude Scale correlates more highly with the Competence Test Total ($r = .59$) than it does with the Otis-Lennon Mental Ability Test ($r = .56$) and the Metropolitan Achievement Tests in reading ($r = .54$) and in language ($r = .49$). Table 3 shows that the second administration of the Career Maturity

Inventory yielded a similar pattern of relationships. The Attitude Scale correlates more highly with the Competence Test (r = .67) than it does with the Otis-Lennon Mental Ability Test (r = .61) and the reading (r = .62) and language (r = .53) tests of the Metropolitan Achievement Tests. When the correlations were corrected for attenuation, the hypothesis was supported for both the first and the second administrations of the Career Maturity Inventory.

The sixth hypothesis predicted that the Attitude Scale raw score should correlate more highly with the Competence Test part (raw) scores than it does with measures of intelligence and school achievement. Tables 2 and 3 show that the results are not consistent with theoretical expectation. The results obtained from the first administration of the Career Maturity Inventory show that the Attitude Scale is correlated more highly with measures of intelligence (r = .56) and school achievement (r = .54, .49) than it is with the part scores of the Competence Test (median r = .48). Results from the second administration also show that the Attitude Scale is correlated more highly with measures of intelligence (r = .61) and reading (r = .62) than it is with the part scores of the Competence Test (median r = .55). When the correlations were corrected for attenuation, the Attitude Scale was found to correlate in the .60s with both the Competence Test subtests and the measures of intelligence and reading. The corrected correlations obtained from the second administration show that the Attitude Scale is correlated mostly in the .70s with both the Competence Test subtests and the measures of intelligence and reading.

The seventh hypothesis predicted that the Competence Test Total raw score would correlate more highly with the Attitude Scale raw score than it does with measures of intelligence and school achievement. Table 2 shows that, contrary to prediction, the Competence Test Total score is more highly correlated

with the measures of intelligence (r = .73) and school achievement (r = .77, .75) than it is with the Attitude Scale (r = .59). Table 3 shows that the correlation between the Competence Test Total and the Attitude Scale (r = .67) is higher than the correlation between the Competence Test Total and the measure of intelligence (r = .64) but lower than the correlation between the Competence Test Total and the Language test (r = .69). When the correlations were corrected for attenuation, the results obtained in the first administration show that the Competence Test Total score is more highly correlated with measures of intelligence (r = .79), reading (r = .83), and language (r = .81) than it is with the Attitude Scale (r = .70). The results obtained in the second administration show that the Competence Test Total is more highly correlated with the Attitude Scale (r = .80) than it is with the other measures (r = .69, .72, .74).

The eighth hypothesis predicted that the Competence Test part scores would correlate more highly with the Attitude Scale than they do with the measures of intelligence and school achievement. Table 4 shows that the results obtained from the first administration of the Career Maturity Inventory do not agree with theoretical expectation because the Competence Test part scores are more highly correlated with the measures of intelligence (median r = .58), reading (median r = .65), and language (median r = .63) than they are with the Attitude Scale (median r = .48). Table 3 shows that some of the results obtained from the second administration are consistent with theoretical expectation because the Competence Test part scores were found to correlate more highly, on the average, with the Attitude Scale (median r = .55) than they are with the measures of intelligence (median r = .51) and reading (median r = .53). When the correlations were corrected for attenuation, the results

obtained from the first administration do not agree with theoretical expectation because the Competence Test part scores are more highly correlated, on the average, with the measures of intelligence (median r = .68), reading (median r = .77), and language (median r = .74) than they are with the Attitude Scale (median r = .64). The corrected correlations obtained from the second administration of the Career Maturity Inventory are consistent with theoretical expectation because the Competence Test part scores are more highly correlated with the Attitude Scale (median r = .71) than they are with the measures of intelligence (median r = .61), reading (median r = .68), and language (median r = .69).

Table 4 shows that the pattern of correlations for white males, white females, black males, and black females is similar to each other as well as to the total group of ninth graders.

Insert Table 4 about here

Table 5 shows that there is a systematic trend in the scores of the different groups. With only one exception (the Otis-Lennon Mental Ability Test score of 83.03 for black females), the groups rank as follows, from highest to lowest, on all the measures: white females, white males, black females, black males.

Insert Table 5 about here

The ninth hypothesis predicted that the Career Maturity Inventory would yield more than one factor. Table 6 shows the results of the factor analysis. Principal-axes solutions involving iterated communalities were undertaken for the correlation matrix. Only the first factor extracted was considered

meaningful in terms of the patterns of loadings and according to Kaiser's (1960) "eigenvalue-one" criterion. All of the measures have high loadings on factor 1.

Insert Table 6 about here

The tenth question deals with the reliability of the Career Maturity Inventory. Table 7 presents the Kuder-Richardson #20 estimates of internal consistency and the 7-month test-retest stability coefficients. The KR 20s range from a low of .64 for Problem Solving to a high of .80 for Planning. The stability coefficients range from .47 for Problem Solving to a high of .78 for the Competence Test Total score.

Insert Table 7 about here

Discussion

The correlation between the Attitude Scale raw score and the Competence Test Total raw score was found to be .59 for the first administration and .67 for the second administration of the Career Maturity Inventory. These correlations are within the predicted range (.50-.69) and particularly support previous studies which have reported correlations of .56 (Westbrook, 1976c) and .64 (Westbrook, 1976d) between the Attitude Scale and the Competence Test. When the obtained correlations (r = .59, .67) were corrected for attenuation, however, the results suggest that the correlation between Career Choice Attitudes and Career Choice Competencies (r = .70, .80) are considerably higher than the .30-.49 range predicted from theory (Crites, 1974b). Nevertheless, the results are probably consistent with the theoretical expectation that Career Choice

Attitudes should be substantially related to Career Choice Competencies, if it can be assumed that the two dimension scores contribute to the measurement of a general career maturity factor.

The results of the second hypothesis agree with the prediction that the Attitude Scale and the Competence Test part scores would correlate in the .40s and .50s. The results also agree with the findings of previous studies (Gasper & Omvig, 1976; Westbrook, 1976c, 1976d). When the correlations were corrected for attenuation, the values obtained suggest that the variables which comprise the Career Choice Competency dimension are correlated in the .60s and .70s with the Career Choice Attitudes dimension.

The results of the third hypothesis show that the part scores of the Competence Test are intercorrelated as hypothesized in the .50s and .60s. However, when the correlations were corrected for attenuation, the values obtained were considerably higher, ranging between the .70s and .90s. These results suggest that the variables which comprise the Career Choice Competencies dimension are more highly interrelated than the .40-.69 range suggested by theory (Crites, 1973a). Whether the intercorrelations are too high to provide separate measures of the construct remains to be determined.

The results of the fourth hypothesis show that, as predicted, the subtests of the Competence Test are more highly correlated with each other than they are with the Attitude Scale. These results suggest that the variables which comprise the Career Choice Competencies dimension have more in common with each other than they have with the Career Choice Attitudes dimension. The data provide support for the contention that the parts of the Competence Test can be regarded as measures of a common process accounted for by the Career Choice Competencies dimension while the Attitude Scale provides a measure

of a different process accounted for by the Career Choice Attitudes dimension in the model of career maturity.

The results of the fifth hypothesis show that, as predicted, the Attitude Scale correlates more highly with the Competence Test Total score than it does with the measures of intelligence, reading, and language. These results suggest that the Career Choice Attitudes dimension has more in common with the Career Choice Competencies dimension than it does with intelligence and school achievement. In other words, the results suggest that the Attitude Scale provides more of a measure of career maturity than it does a measure of intelligence or school achievement.

The results of the sixth hypothesis do not agree with theoretical expectation. Contrary to prediction, the Attitude Scale was found to correlate more highly with measures of intelligence and school achievement than it does with the Competence Test part scores. When the correlations were corrected for attenuation, the results suggest that the Career Choice Attitudes dimension has about as much in common with mental ability ($r = .65, .71$), reading ($r = .62, .72$), and language ($r = .57, .61$) as it does with the variables which comprise the Career Choice Competencies dimension in the model of career maturity (median $r = .64, .71$).

The seventh hypothesis predicted that the Competence Test would correlate more highly with the Attitude Scale than it does with the measures of intelligence and school achievement. The results obtained are contrary to prediction and the corrected correlations suggest that the Career Choice Competencies dimension has about as much in common with intelligence ($r = .79, .69$), reading ($r = .83, .72$), and language ($r = .81, .74$) as it does with the Career Choice Attitudes dimension ($r = .70, .80$).

Based upon the first administration of the Career Maturity Inventory, the findings of the eighth hypothesis do not agree with theoretical expectation and suggest that the variables which comprise the Career Choice Competencies dimension have more in common with intelligence (median r = .68), reading (median r = .77), and language (median r = .74) than they do with the Career Choice Attitudes dimension (median r = .64) in the model of career maturity. However, the findings obtained from the second administration of the Career Maturity Inventory are consistent with theoretical expectation and suggest that the variables which comprise the Career Choice Competencies dimension have more in common with the Career Choice Attitudes dimension (median r = .71) than they do with intelligence (median r = .61), reading (median r = .68), and language (median r = .69).

The results of the factor analysis indicate that all of the measures of career maturity, intelligence, and school achievement have high loadings on factor I. All of the measures seem to require the ability to understand written language. Whether or not the factor can be described as verbal comprehension may be a matter of debate, but it is apparent that all of the measures are highly correlated with the one factor that emerged from the analysis. The results with ninth graders suggest not only that the Career Maturity Inventory provides measures of only one major dimension but also that the dimension measured by the Career Maturity Inventory cannot be differentiated from whatever is measured by standardized measures of intelligence, reading, and language. There is no evidence in this study that the Career Maturity Inventory is providing more than one piece of information.

The internal consistency estimate (Kuder-Richardson Formula 20) obtained with the Attitude Scale (r = .78) is higher than the coefficient (r = .65) reported by Crites (1973a) for 1349 ninth graders in the standardization sample. Since

the Attitude Scale was designed to be heterogeneous, so that different items measure different clusters, we should not expect a very high index of internal consistency. Perhaps the most meaningful estimate of reliability for the Attitude Scale is of the retest variety. The test-retest reliability of the Attitude Scale was found to be .67 which may mean that individuals have changed in different directions or in the same direction at different rates. The latter explanation seems most plausible because the means and standard deviations increased over the seven-month period. The test-retest coefficient reported by Crites (1973a) ($r = .71$) is higher (even though the duration was longer) because pupils from several grades (6-12) were pooled together. Such reliability coefficients "must usually be sharply discounted" (Thorndike & Hagen, 1977, p. 89). It does not take very accurate testing to differentiate the career maturity attitudes of sixth graders from those of twelfth graders. But to classify each sixth grader accurately within his own class is much more demanding.

One of the major concerns about the Career Maturity Inventory is how distinguishable are the several scores that the inventory yields. Taking account of the unreliability of each score, are they really measuring anything different? In each of the subtests, the individual differences in scores are due in part to "true" ability and in part to chance errors of measurement. By extracting an estimate of the correlation between the underlying true scores from our obtained data, we can understand better how much the functions involved have in common. The estimate is provided by the correction for attenuation (Guilford and Fruchter, 1978). For example, the correlation between Occupational Information and Goal Selection is .65, and the KR 20 reliability estimates are .76 and .73, respectively. When the correlation is corrected for attenuation, our estimate is that the correlation between error-free measures of Occupational Information and Goal Selection is .87. In thinking of these two variables, it

would be appropriate to think of the correlation as .87, rather than .65, though the tests correlate only .65. Both appear to measure so nearly the same trait that there would be few cases indeed in which we could feel with confidence that a person is better on one of these traits than on the other.

Sometimes we are interested primarily in the difference between two scores on the Competence Test, such as the difference between Occupational Information and Goal Selection. In this case, the significant fact for each individual is the difference between the two scores. Just how reliable are our estimates of the differences between scores on the subtests? The reliability of the difference between two measures can be obtained by a formula given by Thorndike & Hagen (1978, p. 99). Since the reliability of the Occupational Information test is .76, the reliability of the Goal Selection test is .73, and the correlation between them is .65, for the reliability of the difference score we have

$$r_{Diff} = \frac{1/2\ (.76 + .73) - .65}{1 - .65} = .29$$

The low reliability that tends to characterize difference scores on the Competence Test is something to which the counselor must always be sensitive. It becomes a problem whenever the counselor wishes to use test patterns on the Career Maturity Profile for diagnosis. Thus, the judgment that the client's Occupational Information lags behind his Goal Selection is a judgment that must be made a good deal more tentatively than a judgment about his Occupational Information score or his Goal Selection score taken separately. Any difference needs to be interpreted in the light of the standard error of measurement of that difference. Many differences will be found to be quite small relative to their standard error, and comsequently quite undependable. The interpretation of the Career Maturity Profile is where this caution especially applies.

The Career Maturity Inventory Competence Test correlates highly with reading ability; one sample yielded correlations as high as .77. The correlation for the Career Maturity Inventory Attitude Scale is about .23 lower than that for the Competence Test. We can use statistics like these to interpret the criticism that career maturity measures are indistinguishable from reading ability tests. (See Figure 1.) For example, we would estimate that 59 percent (.77 squared) of the Competence Test duplicates information in the reading ability test. Since the reliability of the Competence Test is about .90, 10 percent would be error and 31 percent is new information.

The Attitude Scale score overlaps much less with reading ability, .54, indicating that 29 percent (.54 squared) of the Attitude Scale duplicates information in the reading ability test. Since the reliability of the Attitude Scale is .78, 22 percent would be error and 49 percent is new information. Although the Attitude Scale has a larger error component than the Competence Test, it provides about 18 percent more new information, primarily because it demands less in reading ability.

The results of this study clearly indicate a need to clarify how career maturity instruments depart from instruments that are interpreted differently. Are we confusing interpretations by giving different names to the same or similar processes, making a distinction where none is needed? Is it possible that we are only fooling ourselves when we call some tests "career maturity" tests and others "intelligence" tests? Whether this criticism is warranted depends upon the career maturity measure. It seems to apply most forcefully to "cognitive" measures of career maturity such as the Competence Test and the Cognitive Vocational Maturity Test (Westbrook, 1970).

A major goal of future investigations should be to collect more evidence for the usefulness of the Career Maturity Inventory. If over the course of numerous investigations the Career Maturity Inventory produces interesting

findings and tends to fit the construct name, career maturity, applied to the instrument, then investigators will be encouraged to continue using the instrument in research, and to use the name to refer to the instrument. On the other hand, if the evidence is dismal in this regard, it will discourage scientists from investing in additional research with the instrument, and it makes them wonder if the instrument really fits the trait name that has been employed to describe it.

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Table 1

Kuder-Richardson and Retest Reliability Coefficients Reported in Previous Investigations of the Career Maturity Inventory

Measure	Investigator	Grade	N	Method	r
Attitude Scale	Crites (1973a)	9	1349	KR 20	.65
	Mowsesian & Holley (Note 1)	8	160	KR 20, 1st Adm.	.70
	Mowsesian & Holley (Note 1)	8	160	KR 20, 2nd Adm.	.81
	Moore & McLean (1977)	14-15	263	KR 20, 1st Adm.	.58
	Moore & McLean (1977)	14-15	238	KR 20, 2nd Adm.	.64
	Crites (1973a)	6-12	1649	Retest, 12 months	.71
	Mowsesian & Holly (Note 1)	8	155	Retest, 3 months	.78
	Moore & McLean (1977)	14-15	202	Retest, 4 months	.60
Self-Appraisal	Crites (1973a)	9	261	KR 20	.78
	Mowsesian & Holley (Note 1)	8	160	KR 20	.71
	Mowsesian & Holley (Note 1)	8	155	Retest, 3 months	.66
Occupational Information	Crites (1973a)	9	197	KR 20	.85
	Mowsesian & Holley (Note 1)	8	160	KR 20	.75
	Mowsesian & Holley (Note 1)	8	155	Retest, 3 months	.64
Goal Selection	Crites (1973a)	9	166	KR 20	.89
	Mowsesian & Holley (Note 1)	8	160	KR 20	.68
	Mowsesian & Holley (Note 1)	8	155	Retest, 3 months	.58
Planning	Crites (1973a)	9	156	KR 20	.88
	Mowsesian & Holley (Note 1)	8	160	KR 20	.70
	Mowsesian & Holley (Note 1)	8	155	Retest, 3 months	.65
Problem Solving	Crites (1973a)	9	140	KR 20	.73
	Mowsesian & Holley (Note 1)	8	160	KR 20	.37
	Mowsesian & Holley (Note 1)	8	155	Retest, 3 months	.58

Table 2

Means, Standard Deviations, and Intercorrelations of the Career Maturity Inventory, the Otis-Lennon Mental Ability Test, and the Reading and Language Subtests of the Metropolitan Achievement Test for Ninth-Grade Pupils (N = 312)

(First Administration of CMI)

Variable	M	SD	CT1	CT2	CT3	CT4	CT5	CTT	AS	IQ	READ	LANG
CT1	9.92	4.03	(.76)	.59	.60	.56	.54		.51	.57	.66	.62
CT2	10.74	3.87	.78	(.76)	.65	.65	.54		.49	.66	.67	.63
CT3	9.29	3.65	.81	.87	(.73)	.62	.54		.48	.57	.61	.65
CT4	9.35	4.19	.72	.83	.81	(.80)	.54		.47	.58	.65	.63
CT5	7.15	3.25	.77	.77	.79	.75	(.64)		.48	.62	.61	.58
CTT	45.91	15.46						(.90)[a]	.59	.73	.77	.75
AS	28.96	5.87	.66	.64	.64	.60	.68	.70	(.78)	.56	.54	.49
IQ	89.59	13.01	.67	.78	.68	.67	.80	.79	.65	(.95)	.81	.72
READ	6.63	2.30	.77	.78	.73	.74	.78	.83	.62	.85	(.96)	.82
LANG	7.19	2.33	.73	.74	.78	.72	.74	.81	.57	.75	.85	(.96)

[a] Estimated

Note: Career Maturity Inventory administered October, 1975
Otis Lennon Mental Ability Test administered March, 1976
Metropolitan Achievement Test administered May, 1975

Note: Values in paranthesis are KR 20's.

Note: Correlations below the diagonal are corrected for attenuation. using the KR 20 estimates for each variable.

Table 3

Means, Standard Deviations, and Intercorrelations of the Career Maturity Inventory, the Otis-Lennon Mental Ability Test, and the Reading and Language Subtests of the Metropolitan Achievement Test

(N = 193)

(Second Administration of CMI)

Measures	M	SD	CT1	CT2	CT3	CT4	CT5	CTT	AS	IQ	READ	LANG
CT1	9.25	4.03	(.76)	.63	.62	.62	.53		.55	.48	.62	.61
CT2	10.44	4.25	.83	(.76)	.72	.58	.56		.59	.62	.61	.61
CT3	10.25	4.41	.83	.97	(.73)	.58	.51		.53	.51	.51	.56
CT4	9.96	3.65	.80	.74	.76	(.80)	.55		.54	.49	.48	.55
CT5	7.67	3.30	.76	.80	.75	.77	(.64)		.56	.52	.53	.54
CTT	47.42	16.16						(.90[a])	.67	.64	.67	.69
AS	30.20	6.20	.71	.77	.70	.68	.79	.80	(.78)	.61	.62	.53
IQ	89.59	13.01	.56	.73	.61	.56	.67	.69	.71	(.95)	.81	.72
READ	6.63	2.30	.73	.71	.61	.55	.68	.72	.72	.85	(.96)	.82
LANG	7.19	2.33	.71	.71	.67	.63	.69	.74	.61	.75	.85	(.96)

[a]Estimated

Note: Career Maturity Inventory administered May, 1976

Otis Lennon Mental Ability Test administered March, 1976

Metropolitan Achievement Test administered May, 1975

Note: Values below the diagonal are corrected for attenuation.

Note: Values in parenthesis are KR 20's.

Table 4

Means, Standard Deviations, and Intercorrelations of the Career Maturity Inventory, the Otis-Lennon Mental Ability Test, and the Reading and Language Subtests of the Metropolitan Achievement Test

Variables	M	SD	CT1	CT2	CT3	CT4	CT5	CTT	AS	IQ	READ	LANG
White Males (N = 64)												
CT1	9.73	4.14		.52	.62	.61	.49	.82	.46	.58	.66	.59
CT2	11.83	3.82			.68	.65	.35	.80	.36	.50	.54	.52
CT3	10.14	3.77				.70	.50	.86	.44	.51	.66	.72
CT4	10.09	4.41					.40	.86	.47	.62	.66	.67
CT5	7.77	3.05						.64	.32	.60	.58	.48
CTT	49.38	15.51							.51	.68	.76	.73
AS	30.77	5.25								.49	.48	.44
IQ	95.35	13.59									.82	.67
READ	7.41	2.37										.86
LANG	7.57	2.63										
WHITE FEMALES (N = 56)												
CT1	12.73	3.87		.52	.45	.37	.46	.65	.36	.31	.61	.39
CT2	13.25	3.79			.71	.62	.66	.85	.52	.63	.67	.69
CT3	11.71	3.05				.65	.58	.81	.36	.63	.58	.52
CT4	11.20	4.35					.70	.85	.51	.47	.55	.58
CT5	9.54	3.44						.84	.60	.60	.56	.59
CTT	58.16	15.23							.59	.68	.73	.70
AS	31.84	4.95								.57	.53	.46
IQ	99.34	12.72									.73	.70
READ	8.23	2.07										.81
LANG	8.73	2.02										

BLACK MALES (N = 112)

CT1	8.08	3.43	.52	.47	.47	.35	.73	.52	.56	.53	.57
CT2	9.29	3.48		.49	.57	.41	.79	.36	.64	.62	.58
CT3	7.92	3.45			.49	.38	.75	.34	.44	.45	.54
CT4	7.81	3.81				.48	.80	.36	.61	.65	.63
CT5	6.11	2.77					.66	.41	.53	.53	.53
CTT	39.06	12.53						.51	.71	.70	.73
AS	27.20	5.37							.50	.41	.41
IQ	86.41	10.85								.78	.70
READ	5.93	2.15									.75
LANG	6.48	2.08									

BLACK FEMALES (N = 79)

CT1	9.10	3.61	.54	.60	.58	.57	.83	.46	.53	.63	.58
CT2	10.09	3.37		.56	.67	.51	.82	.48	.62	.65	.55
CT3	8.81	3.23			.55	.46	.79	.49	.50	.60	.60
CT4	9.59	3.74				.45	.83	.44	.59	.65	.50
CT5	6.51	2.92					.73	.40	.53	.55	.53
CTT	44.11	13.53						.57	.69	.77	.69
AS	27.96	6.53							.52	.54	.46
IQ	83.03	9.67								.76	.73
READ	5.95	1.88									.79
LANG	6.88	2.13									

Table 5

Means and Standard Deviations of Different Groups of 9th Grade Students on Measures of Mental Ability, School Achievement, and the First Administration of the Career Maturity Inventory

Measure	Statistics	Group			
		Black Males (N=112)	Black Females (N=79)	White Males N=64)	White Females (N=56)
Competence Test					
Self Appraisal	M	8.08	9.10	9.73	12.73
	SD	3.43	3.61	4.14	3.87
Occupational Information	M	9.29	10.09	11.83	13.25
	SD	3.48	3.37	3.82	3.79
Goal Selection	M	7.92	8.81	10.14	11.71
	SD	3.45	3.23	3.77	3.05
Planning	M	7.81	9.59	10.09	11.20
	SD	3.81	3.74	4.41	4.35
Problem Solving	M	6.11	6.51	7.77	9.54
	SD	2.77	2.92	3.05	3.44
Total Score	M	39.06	44.11	49.38	58.16
	SD	12.53	13.53	15.51	15.23
Attitude Scale	M	27.20	27.96	30.77	31.84
	SD	5.37	6.53	5.25	4.95
Otis-Lennon Mental Ability Test	M	86.41	83.03	95.35	99.34
	SD	10.85	9.67	13.59	12.72

Metropolitan Achievement Test					
Reading	M	5.93	5.95	7.41	8.23
	SD	2.15	1.88	2.37	2.07
Language	M	6.48	6.88	7.57	8.73
	SD	2.08	2.13	2.63	2.02

Table 6

Factor Loadings and Proportions of Common - Factor, Specific, and Error Variance in the Career Maturity and Non-Career Maturity Measures for 9th Graders

(N = 312)

Measures[a]	Factor	Proportions			
		Specific	Error	Communality	Reliability[b]
	I	S	E	h^2	r
Career Maturity Measures					
CMICT Self Appraisal	.79	.13	.24	.63	.76
CMICT Occupational Info.	.82	.08	.24	.68	.76
CMICT Goal Selection	.78	.11	.27	.62	.73
CMICT Planning	.80	.16	.20	.64	.80
CMICT Problem Solving	.77	.05	.36	.59	.64
CMI Attitude Scale	.68	.32	.22	.46	.78
Non-Career Maturity Measures					
OLMAT Deviation IQ	.85	.22	.05	.73	.95
MAT Reading Grade Equivalent	.89	.18	.04	.78	.96
MAT Language Grade Equivalent	.85	.23	.04	.73	.96
Eigenvalue	5.84				
Variance	64.90%				

[a]Abbreviations: CMICT = Career Maturity Inventory Competence Test
CMI = Career Maturity Inventory

[b]Based upon K-R #20

Table 7

Means, Standard Deviations, Kuder-Richardson Internal Consistencey Estimates, and Test-Retest Stability Coefficients Based Upon Two Administrations of CMI to Ninth Graders

Subtest	N[a]	Oct., 1975 Testing Raw Score		May, 1976 Testing Raw Score		K-R #20[c]	Test-retest r[b]
		Mean	S.D.	Mean	S.D.		
Attitude Scale	193	28.56	5.84	30.20	6.20	.78	.67
Competence Test							
Self-Appraisal	193	8.87	3.75	9.25	4.03	.76	.62
Occupational Information	193	10.19	3.77	10.44	4.25	.76	.65
Goal Selection	193	8.56	3.99	10.25	4.41	.73	.53
Planning	193	8.66	3.45	9.96	3.65	.80	.55
Problem Solving	193	6.56	2.98	7.67	3.30	.64	.47
Total	193	42.87	14.10	47.42	16.16	___	.78

[a] Based upon the pupils who took both pretest and post-test.

[b] Tested and retested over a seven-month duration.

[c] KR 20 for the Competence Test total score was not computed.

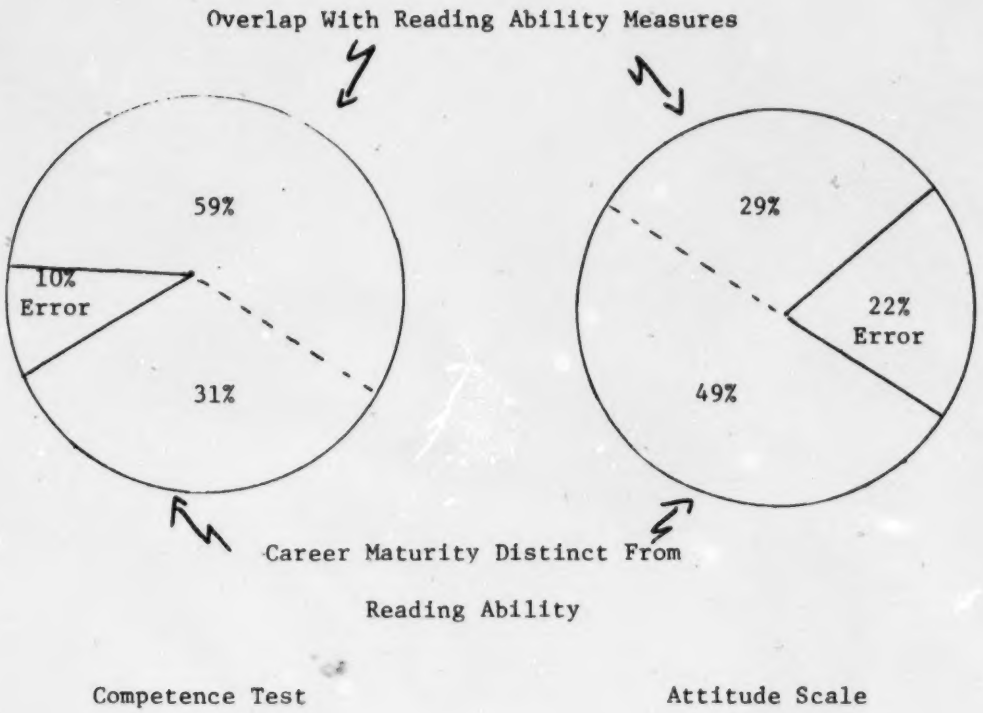

Figure 1. Overlap of Career Maturity Inventory scores with a concurrent measure of reading ability.